

AMENDMENTS

In the Claims

Please amend claims 1 and 67 as indicated among the following complete set of pending claims:

Claim 1. (Currently Amended) A method for oxidizing a fuel, comprising:

providing a catalyst mixture including at least [one compound having at least one element selected from the group consisting of group III and group IIA] a concentration of at least about 0.07 mg/ml of Al as AlCl₃, and [at least one compound having at least one element selected from the group consisting of group IA, group IVA, group VI, group VII, group VIII, group IB, group IIB, and combinations thereof] a concentration of at least about 0.1 mg/ml of Re as perrhenic acid, a concentration of at least about 0.07 mg/ml of Rh as RhCl₃, a concentration of at least about 0.28 mg/ml of Pt as H₂PtCl₆.6H₂O;

mixing a portion of the catalyst mixture with combustion air prior to mixing the catalyst mixture with a fuel to be oxidized; and

oxidizing the fuel.

Claim 2. (Original) The method of claim 1, further comprising adding a liquid to the catalyst mixture before mixing it with the combustion air.

Claim 3. (Currently Amended) The method of claim 2, wherein the liquid comprises one or more liquids selected from the group consisting of ethylene glycol and water.

Claim 4. (Original) The method of claim 3, wherein the liquid further comprises lithium chloride.

Claim 5. (Original) The method of claim 1, further comprising sparging a gas through the catalyst mixture to generate fluidized catalyst particles to mix with the combustion air.

Claim 6. (Original) The method of claim 5, further comprising ionizing the sparging gas prior to sparging it through the catalyst mixture.

Claim 7. (Original) The method of claim 5, wherein the sparging gas is selected from the group consisting of air, helium, nitrogen, argon, and combinations thereof.

Claim 8. (Canceled).

Claim 9. (Currently Amended) The method of claim 1, wherein the catalyst mixture further comprises one or more of [platinum, rhodium, rhenium,] manganese, iron, [aluminum,] magnesium and molybdenum.

Claim 10. (Original) The method of claim 1, wherein oxidizing the fuel comprises oxidizing the fuel in an open flame.

Claim 11. (Original) The method of claim 1, wherein oxidizing the fuel comprises oxidizing the fuel in an enclosed flame.

Claim 12. (Original) The method of claim 1, wherein oxidizing the fuel comprises oxidizing gasoline.

Claim 13. (Original) The method of claim 1, wherein oxidizing the fuel comprises oxidizing diesel fuel.

Claim 14. (Original) The method of claim 1, wherein oxidizing the fuel comprises oxidizing a fuel selected from the group consisting of number 2 fuel oil, fuel oil refined from crude oil, diesel fuel, gasoline, compressed or liquified natural gas, gasohol, any hydrocarbon having one or more carbon atoms such as methane, ethane, propane, butane, isobutane, toluene, xylene, octane, benzene, mixtures of alcohols having methanol, ethanol, propanol, butanol, isopropanol, isobutanol, pentanol, hexanol, heptanol, octanol and combinations thereof, vegetable oil such as corn oil, mineral oil, coal, coal gas, asphalt vapor, oxidizable vapors from chemical processes, wood, paper and combinations thereof.

Claim 15. (Original) The method of claim 1, wherein oxidizing the fuel comprises oxidizing within a combustion chamber of a reciprocating engine selected from the group consisting of a gasoline fuel engine and a diesel fuel engine.

Claim 16. (Original) The method of claim 1, wherein oxidizing the fuel comprises oxidizing the fuel within a combustion chamber of a reciprocating engine, wherein the fuel is selected from the group consisting of number 2 fuel oil, fuel oil refined from crude oil, diesel fuel, gasoline, compressed or liquified natural gas, gasohol, any hydrocarbon having one or more carbon atoms such as methane, ethane, propane, butane, isobutane, toluene, xylene, octane, benzene, mixtures of alcohols having methanol, ethanol, propanol, butanol, isopropanol, isobutanol, pentanol, hexanol, heptanol, octanol and combinations thereof, vegetable oil such as corn oil, mineral oil, coal, coal gas, asphalt vapor, oxidizable vapors from chemical processes, wood, paper and combinations thereof.

Claim 17. (Currently Amended) The method of claim 1, wherein oxidizing the fuel comprises oxidizing within a flame zone of an [appratus] apparatus selected from the group consisting of a furnace, a boiler and an incinerator.

Claim 18. (Original) The method of claim 1, wherein oxidizing the fuel further comprises oxidizing within an apparatus selected from the group consisting of an incinerator, a vent gas burner, a furnace, a steam turbine and combinations thereof.

Claim 19. (Original) The method of claim 1, wherein providing the catalyst mixture further comprises providing the catalyst mixture having a pH of less than about 4.0.

Claim 20. (Original) The method of claim 19, wherein providing the catalyst mixture further comprises providing the catalyst mixture having a pH of between about 1.4 and about 3.0.

Claim 21. (Original) The method of claim 20, wherein providing the catalyst mixture further comprises providing the catalyst mixture having a pH of between about 1.6 and about 2.2.

Claim 22. (Canceled).

Claim 23. (Canceled).

Claim 24. (Original) The method of claim 1, wherein the catalyst mixture further comprises a surfactant.

Claim 25. (Original) The method of claim 2, wherein the liquid further comprises a surfactant.

Claim 26. (Original) The method of claim 1, wherein mixing a portion of the catalyst with the combustion air comprises transporting the catalyst particles to a combustion air intake to the flame zone and mixing the catalyst with the combustion air within the air intake.

Claim 27. (Original) The method of claim 1, wherein a ratio of Pt to Rh in the mixture is between about 15 to 1 and about 4 to 1, a ratio of Pt to Re in the mixture is between about 15 to 1 and about 2 to 1, and a ratio of Pt to Al in the mixture is between about 15 to 1 and about 2 to 1.

Claim 28. (Original) The method of claim 24, wherein the ratio of Pt to Rh in the mixture is about 8.6 to 1, the ratio of Pt to Re in the mixture is about 6 to 1, and the ratio of Pt to Al in the mixture is about 8.6 to 1.

Claims 29-66 (Canceled).

Claim 67 (New) A method for oxidizing a fuel, comprising:

providing a catalyst mixture including at least a concentration of at least about 0.07 mg/ml of Mg as MgCl₂, and a concentration of at least about 0.1 mg/ml of Re as perrhenic acid, a concentration of at least about 0.07 mg/ml of Rh as RhCl₃, a concentration of at least about 0.28 mg/ml of Pt as H₂PtCl₆.6H₂O, and combinations thereof;

mixing a portion of the catalyst mixture with combustion air prior to mixing the catalyst mixture with a fuel to be oxidized; and

oxidizing the fuel.

Claim 68. (New) The method of claim 67, further comprising adding a liquid to the catalyst mixture before mixing it with the combustion air.

Claim 69. (New) The method of claim 68, wherein the liquid comprises one or more liquids selected from the group consisting of ethylene glycol and water.

Claim 70. (New) The method of claim 69, wherein the liquid further comprises lithium chloride.

Claim 71. (New) The method of claim 67, further comprising sparging a gas through the catalyst mixture to generate fluidized catalyst particles to mix with the combustion air.

Claim 72. (New) The method of claim 71, further comprising ionizing the sparging gas prior to sparging it through the catalyst mixture.

Claim 73. (New) The method of claim 71, wherein the sparging gas is selected from the group consisting of air, helium, nitrogen, argon, and combinations thereof.

Claim 74 (New) The method of claim 67, wherein the catalyst mixture further comprises one or more of manganese, iron, and molybdenum.

Claim 75. (New) The method of claim 67, wherein oxidizing the fuel comprises oxidizing the fuel in an open flame.

Claim 76. (New) The method of claim 67, wherein oxidizing the fuel comprises oxidizing the fuel in an enclosed flame.

Claim 77. (New) The method of claim 67, wherein oxidizing the fuel comprises oxidizing gasoline.

Claim 78. (New) The method of claim 67, wherein oxidizing the fuel comprises oxidizing diesel fuel.

Claim 79. (New) The method of claim 67, wherein oxidizing the fuel comprises oxidizing a fuel selected from the group consisting of number 2 fuel oil, fuel oil refined from crude oil, diesel fuel, gasoline, compressed or liquified natural gas, gasohol, any hydrocarbon having one or more carbon atoms such as methane, ethane, propane, butane, isobutane, toluene, xylene, octane, benzene, mixtures of alcohols having methanol, ethanol, propanol, butanol, isopropanol, isobutanol, pentanol, hexanol, heptanol, octanol and combinations thereof,

vegetable oil such as corn oil, mineral oil, coal, coal gas, asphalt vapor, oxidizable vapors from chemical processes, wood, paper and combinations thereof.

Claim 80. (New) The method of claim 67, wherein oxidizing the fuel comprises oxidizing within a combustion chamber of a reciprocating engine selected from the group consisting of a gasoline fuel engine and a diesel fuel engine.

Claim 81. (New) The method of claim 67, wherein oxidizing the fuel comprises oxidizing the fuel within a combustion chamber of a reciprocating engine, wherein the fuel is selected from the group consisting of number 2 fuel oil, fuel oil refined from crude oil, diesel fuel, gasoline, compressed or liquified natural gas, gasohol, any hydrocarbon having one or more carbon atoms such as methane, ethane, propane, butane, isobutane, toluene, xylene, octane, benzene, mixtures of alcohols having methanol, ethanol, propanol, butanol, isopropanol, isobutanol, pentanol, hexanol, heptanol, octanol and combinations thereof, vegetable oil such as corn oil, mineral oil, coal, coal gas, asphalt vapor, oxidizable vapors from chemical processes, wood, paper and combinations thereof.

Claim 82. (New) The method of claim 67, wherein oxidizing the fuel comprises oxidizing within a flame zone of an apparatus selected from the group consisting of a furnace, a boiler and an incinerator.

Claim 83. (New) The method of claim 67, wherein oxidizing the fuel further comprises oxidizing within an apparatus selected from the group consisting of an incinerator, a vent gas burner, a furnace, a steam turbine and combinations thereof.

Claim 84. (New) The method of claim 67, wherein providing the catalyst mixture further comprises providing the catalyst mixture having a pH of less than about 4.0.

Claim 85. (New) The method of claim 84, wherein providing the catalyst mixture further comprises providing the catalyst mixture having a pH of between about 1.4 and about 3.0.

Claim 86. (New) The method of claim 85, wherein providing the catalyst mixture further comprises providing the catalyst mixture having a pH of between about 1.6 and about 2.2.

Claim 87. (New) The method of claim 67, wherein the catalyst mixture further comprises a surfactant.

Claim 88. (New) The method of claim 68, wherein the liquid further comprises a surfactant.

Claim 89. (New) The method of claim 67, wherein mixing a portion of the catalyst with the combustion air comprises transporting the catalyst particles to a combustion air intake to the flame zone and mixing the catalyst with the combustion air within the air intake.

Claim 90. (New) The method of claim 67, wherein a ratio of Pt to Rh in the mixture is between about 15 to 1 and about 4 to 1, a ratio of Pt to Re in the mixture is between about 15 to 1 and about 2 to 1, and a ratio of Pt to Mg in the mixture is between about 15 to 1 and about 2 to 1.

Claim 91. (New) The method of claim 87, wherein the ratio of Pt to Rh in the mixture is about 8.6 to 1, the ratio of Pt to Re in the mixture is about 6 to 1, and the ratio of Pt to Mg in the mixture is about 8.6 to 1.